

## REMARKS

Claims 14 to 22 have been added, and therefore 1 to 22 are now pending. Claims 1 and 5 to 13 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 4,909,922 to Kato et al. ("the Kato reference") in view of any of U.S. Patent No. 4,729,549 to Kojima et al. ("the Kojima reference"), U.S. Patent No. 4,787,966 to Nakajima et al ("the Nakajima reference"), U.S. Patent No. 5,203,983 to Ohyama et al. ("the Ohyama reference"), and/or U.S. Patent No. 4,365,604 to Sone ("the Sone reference") and with evidence by Logothetis et al. ("High-temperature Oxygen Sensors", ACS Symposium Series) ("the Logothetis reference").

Claim 1 is directed to an electrochemical sensor including a solid electrolyte element having at least one first electrode, at least one second electrode and at least one heating element, in which the at least one second electrode is situated closer than the at least one first electrode to the at least one heating element, in which the "*at least one second electrode is coupled to ground*", and in which the "*at least one first electrode*" coacts with the at least one second electrode and is "*negatively polarized*".

The Office Action asserts that Kato discloses an electrochemical sensor comprising a solid electrolyte element including a first electrode, a second electrode, and a heating element, in which the second electrode is situated closer to the heating element than the first electrode and is coupled to a lower potential terminal of the heating element. Although Kato does not specify that the lower potential terminal is connected to ground, the Office Action refers to the Sone, Ohyama, Nakajima and Kojima references that allegedly show the use of ground as a negative potential for a heating element.

Thus, the Office Action asserts that it would have been "obvious" to use ground as a potential for the second electrode of claim 1, without any support from any of the references cited in the Office Action or any other references of record. To reject a claim based on obviousness, however, there must be some suggestion or motivation to modify a reference or to combine reference teachings in a manner contemplated by the claim, and the prior art references (alone or combined) must teach or suggest all of claim limitations. (See M.P.E.P. § 2142).

It is respectfully asserted that the references relied upon would not motivate a person having ordinary skill in the art to use ground as a potential for the second electrode, as recited in the context of claim 1.

a) Sone suggested using auto battery and auto belt conv. flow rate that is ground is a conventional negative potential present in automotive electronics

None of the secondary Sone, Ohyama, Nakajima or Kojima references cure the deficiencies of the primary Kato reference. Regardless of whether Kato, Sone, Ohyama, Nakajima or Kojima may refer to using ground as the negative potential of an automotive battery, as suggested by the Office Action, none of these references, (whether taken alone or in combination) describe nor suggest “*at least one second electrode . . . coupled to ground*” as recited in the context of claim 1.

The Office Action then conclusorily asserts that the “first electrode would *inherently* be negatively polarized by induced EMF.” (Office Action, page 3, paragraph 1; emphasis added). As Applicant has already explained in the appeal brief, with regard to the use of the anticipation doctrine of “inherency” in an obviousness rejection, the Board of Patent Appeals & Interferences in *Ex parte Schricker* has stated that:

[O]n the one hand the examiner talks in terms of inherency (which is really an anticipation rationale) while on the other hand the examiner talks in terms that it would have been obvious to experiment to divine optimum conditions.

*Inherency and obviousness are somewhat like oil and water -- they do not mix well.* Claimed subject matter can be anticipated because a prior art reference describes a method which inherently meets the limitations of a claimed method. Claimed subject matter can be unpatentable for obviousness when, notwithstanding a difference between that subject matter and a prior art reference, the claimed subject matter, as a whole, would have been obvious.

this point is irrelevant  
The obviousness  
came from the  
teaching of grnd,  
not from this  
inherency. Exmr  
is not mixing  
the point inherency  
and obviousness

(See *Ex parte Schricker*, 56 U.S.P.Q.2d 1723, 1725 (Bd. Pat. App. & Int. 2000) (obviousness rejections vacated and remanded) (citations omitted; unpublished)).

It is therefore respectfully submitted that the Office Action wrongly relies on inherency to support an otherwise unsupportable obviousness assertion.

It is therefore respectfully submitted that the references relied on (whether taken alone or otherwise) do not describe nor suggest the presently claimed subject matter for the reasons discussed above, so that claim 1 (as well as its dependent claims 2 to 12) are allowable.

Since claim 13 includes features analogous to those of claim 1, it is allowable for essentially the same reasons.

As further regards claim 5, the Office Action conclusorily asserts that both Nakajima and Kojima set forth electrodes of the same size, and that it would have been obvious to a person with ordinary skill in the art to utilize electrodes of the same size, since the art already

recognizes the use of electrodes of equal size. Further, the Office action relies on *In re Rose*, 220 F.2d 459 (C.C.P.A. 1955), to assert that a change in size is generally recognized as being within the level of ordinary skill in the art.

With respect to Nakajima and Kojima, it is believed that these references both relate to oxygen sensors with electrodes situated on opposite sides of a solid electrolyte. The Office Action, however, does not indicate in what way the text of these references suggest that the electrodes may be the same size. To reject claims for obviousness, the examiner "must cite the best references at his or her command," and when a reference "shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable." 37 C.F.R. § 1.104(c)(2). Furthermore, the mere possibility that some of the drawings of Nakajima and Kojima may show electrodes that appear to be similar in size -- which is not conceded by Applicant, does not mean that the electrodes referred to in the drawings are in fact the same size. When a reference does not disclose that drawings are to scale and is silent as to dimensions, arguments based on the measurement of the drawing features are of little value. *See Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951 (Fed. Cir. 2000). Neither Nakajima nor Kojima specifically states nor even suggests that any of the drawings are made to scale or properly dimensioned. It is therefore respectfully submitted that the possibility that the drawings of Nakajima and Kojima may contain electrodes that appear similar in size cannot form the basis for a conclusion that these references "set forth the use of electrodes which are all the same size", as asserted in the Office Action.

As to *In Re Rose*, that case concerned a lumber package composed of individual bundles of lumber that varied in length. The *Rose* Court stated that "the weight of the bundles was not patentably significant since it at most relates to the size of the [lumber]". *Id.* In contrast, claim 5 provides that the second electrode has "approximately the same surface size as the at least one first electrode", which was not arbitrarily chosen, and as expressed in the Specification, increasing the size of the second electrode so that it has "approximately the same surface size as the at least one first electrode" provides further shielding against any coupling of the heater voltage  $U_H$  into the measurement electrode (i.e., the at least one first electrode). (Specification, page 3, lines 7 to 11). It is therefore respectfully submitted that claim 5 is allowable for this further reason.

This does not obviate that ~~that~~ electrode size require only routine skill in the art

Claims 2 to 4 were rejected under 35 U.S.C. § 103 (a) as unpatentable over the Kato reference in view of the Ohyama, Kojima, Nakajima or Stone references, and in further view of the Logothetis reference.

It is respectfully submitted that any review of the third-level Logothetis reference makes plain that it simply does not cure the critical deficiencies of the primary or secondary references, and that claims 2 to 4 are therefore allowable for the same reasons as claim 1, as explained above with respect to the Kato reference.

Claims 1, 7, 8, 10, 12 and 13 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 4,400,260 to Stahl et al. (“the Stahl reference”) in view of the Ohyama, Kojima, Nakajima or Stone references, and as evidenced by the Logothetis reference.

Although Stahl does not specify that the lower potential terminal is connected to ground, the Office Action asserts that it would have been obvious to one having ordinary skill in the art to use the teachings of Ohyama, Kojima, Nakajima or Stone with the sensor of Stahl. With respect to polarization of the first electrode, the Office Action asserts that if the “oxygen were greater in the measured portion than in the reference passage, the first electrode would be inherently polarized”, and further asserts that the claim does not specify an operating condition where the measured gas concentration is less than the reference gas composition, so that Stahl would (in potentiometric mode) *inherently* meet the polarization limitation “when the measured gas is of a greater concentration than the reference gas”. (Office Action, page 6, 1<sup>st</sup> paragraph).

First, as regards the obviousness of using ground as recited in the context of the subject matter as claimed, the secondary Ohyama, Kojima, Nakajima or Stone references in view of the third-level Logothetis reference do not cure the deficiencies of the primary Stahl reference for the same reasons as explained above with respect to the Kato reference. Second, it is respectfully submitted that the Office Action’s assertion that Stahl would, in potentiometric mode, “*inherently* meet the polarization limitation when the measured gas is of a greater concentration than the reference gas” is wrong.

Claim 1 provides that the first electrode (that is, the one in contact with the measured gas) is the one that is negatively polarized. But in potentiometric mode (that is, when a reverse oxygen pump is not used), the first electrode may be negatively polarized when a measured amount of oxygen *is less than* an amount of oxygen in a reference gas (that is, when the oxygen partial pressure of the measured gas is less than that of the reference gas) -- and not vice versa as suggested by the Office Action. The Logothetis reference, which the Office

Action so unexplainedly relies upon, makes this assertion clear. At the “lower oxygen partial pressure side, two oxygen ions combine to give an oxygen molecule to the gas phase leaving four electrons on the . . . electrode,” so that the “net result . . . is the transfer of . . . four electrons from electrode 2 to electrode 1”. (Logothetis, page 137, paragraph 3). Thus, since the electrode on the lower oxygen partial pressure side is the one that receives the four extra electrons and since electrons are negatively charged, the electrode on the measured gas side is the one that is negatively polarized because the measurement gas has a lower oxygen partial pressure.

In short, since the first electrode of claim 1 may not be negatively polarized in potentiometric mode if the measured oxygen concentration is greater than the reference oxygen concentration, the Office Action’s assertion that “Stahl would *inherently* meet the polarization limitation when the measured gas is of a greater concentration than the reference gas” simply fails.

For at least the foregoing reasons, it is respectfully asserted that claim 1 is allowable. Further, since claims 7, 8, 10 and 12 depend from claim 1, and since claim 13 includes features analogous to those of claim 1, it is respectfully asserted that claims 7, 8, 10, 12 and 13 are also allowable for the same or for essentially the same reasons.

Claims 1 to 13 were rejected under 35 U.S.C. § 103 (a) as unpatentable over U.S. Patent No. 5,413,683 to Murase et al. (“the Murase reference”) in view of the Kato reference.

The Murase reference purportedly concerns an oxygen sensing apparatus for detecting an oxygen concentration of a gas, including a first electrochemical cell having an oxygen-ion conductive solid electrolyte body and a reference and a measuring electrode, for producing an electromotive force corresponding to the oxygen concentration of the gas. It is, however, respectfully asserted that the four assertions of in the Office Action are incorrect.

With respect to the first assertion, Murase does not disclose coupling a second (reference) electrode to ground, as asserted by the Office Action, but it instead refers to a reference electrode 24 connected to both a power source 34 across a resistor and an electronic circuit 38.

With respect to the second assertion, any review of Murase makes plain that the second electrode of Murase does not communicate with an atmosphere 16 and that it does not read on the specification term “reference duct” for at least the following reasons. First, reference numeral “16” of Murase does not label an “atmosphere”, as suggested by the Office Action, but it labels a measurement-gas chamber. (See Murase, col. 8, lines 17 to 20).

Second, the measurement-gas chamber 16 of Murase is not “situated between the at least one first electrode and the at least one heating element”, as is the reference duct of claim 9.

Third, the reference electrode 24 of Murase is not “in the reference duct”, as provided for by claim 9. Also, with respect to the third assertion, the term “reference”, as used in the claims, is clearly defined. In particular, the terms of a claim are not interpreted in a vacuum, since a pending claim must be “given the broadest reasonable interpretation consistent with the specification.” M.P.E.P. § 2111. Thus, the Specification and the claims clearly define the use of the term “reference” as used in the claims.

With respect to the fourth assertion, the Office Action has not pointed to a single line of text or a drawing that would indicate that the Murase reference discloses electrodes of similar size. The Office has the initial burden of demonstrating a *prima facie* case of obviousness and, as explained above, in rejecting claims for obviousness, the “examiner must cite the best references at his or her command,” and when a reference “shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable.” 37 C.F.R. § 1.104(c)(2).

Therefore, for at least the foregoing reasons, it is respectfully asserted that independent claim 1 and dependent claim 9 are allowable. Further, since claims 2 to 8 and 10 to 12 depend from claim 1, and since claim 13 includes features analogous to those of claim 1, it is respectfully submitted that claims 2 to 8, 10 to 12 and 13 are allowable for the same or for essentially the same reasons.

New claims 14 to 22 do not add any new matter and are supported in the specification. Claims 14 to 20 depend from claim 1, and are therefore allowable for the same reasons as claim 1. Claim 21 includes features analogous to those of claim 1 (and certain of its dependent claims), and is therefore allowable for essentially the same reasons as claim 1, as is claim 22 that depends from claim 21.

**CONCLUSION**

Applicant therefore respectfully submits that claims 1 to 22 are allowable. Prompt reconsideration, withdrawal of the rejections, and allowance of the present application are therefore respectfully requested.

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Respectfully submitted,

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